

# ONYX 110™



## INSTRUCTION MANUAL

The Onyx 110 charger is perfect for entry-level electric car or boat modelers who want automatic peak detection charger for NiCd and NiMH batteries, and that will accept AC or DC input power. Selectable charge currents range from 1 to 4 amps, for cells as small as 600mAh "AAA" and as big as sub-C size – good for 1/18<sup>th</sup> to 1/8<sup>th</sup> scale electric models. A unique jack is built-in which is handy for charging 4, 5, or 8 cell radio batteries! The small size and light weight make the Onyx 110 charger easy to use at home, or to take to the track.

**Duratrax®**

**STOP** It is strongly recommended to completely read this manual before use! Damage resulting from misuse or modification will void your warranty.

## SPECIFICATIONS

<b>AC input:</b>	110V AC 60Hz	<b>Auto-trickle current:</b>	1/20 fast charge setting
<b>DC input:</b>	11-15 V DC, built-in lead with alligator clips	<b>Controls:</b>	auto-start, switchable current selector
<b>Battery types:</b>	4-8 NiCd or NiMH Cells (4.8-9.6V, limited to 7 cells on DC)	<b>LED indicator:</b>	red
<b>Battery capacity range:</b>	600 - 6000 mAh	<b>* Output connections:</b>	built-in lead with standard connector built-in jack for charging 4, 5, or 8 cell radio packs
<b>Fast charge current:</b>	1, 2, or 4 A linear (2A limit on AC)	<b>Protective devices:</b>	solid-state reverse polarity and current overload
<b>Fast charge termination:</b>	peak detection	<b>Case size:</b>	3.4 x 4.8 x 1.8" (87 x 123 x 45 mm)
<b>Fast charge safety timer:</b>	90 minutes	<b>Weight:</b>	6.95 oz (197 g)
<b>Peak sensitivity:</b>	8 mV		

### \* Charge adapters available separately:

- Standard to Deans® Ultra® male (DTXC2209)
- Standard to Vendetta™ Mini Quake™ RS4 Battery (DTXC2210)
- Standard to Traxxas® male (DTXC2203)
- Standard to Futaba® Tx Charge Jack (DTXP4151)

## SPECIAL FEATURES

- Tiny, lightweight built-in switching AC power supply is great for portability and small pit areas.
- Selectable charge currents of 1A, 2A, and 4 amps with auto-trickle function.
- Peak detection intelligence eliminates the need for tracking the charge state of the battery before charge, and an automatic trickle charge tops off packs to maximum power.
- An auto-start function with status LED make setup and use a snap.
- Compatible with nickel-cadmium (NiCd) and nickel-metal hydride (NiMH) battery types.
- Includes a built-in socket for charging 4- or 5-cell receiver batteries, and even 8-cell transmitter batteries.
- A DC power lead with alligator clips easily connects to many types of 12V DC power sources.
- Solid-state reverse polarity and current overload safety devices ensure trouble-free operation.

## IMPORTANT PRECAUTIONS



**Disconnect the battery and remove input power from the charger immediately if the charger becomes hot!!**

- Do not attempt to charge any battery types other than NiCd or NiMH as permanent damage to the battery and charger could result.
- Do not use automotive type battery chargers to power the charger.
- Do not allow water, moisture or foreign objects into the charger.
- Do not block air intake holes, which could cause the charger to overheat.
- Do not attempt to use batteries with more cells or total voltage than listed in the specifications.

- Do not leave the charger unattended while in use.
- Do not leave your battery inside your model while charging. Do not use the charger and battery inside a full-size automobile or on a cluttered workbench, and avoid placing them on or near flammable surfaces and combustible materials (including carpet, paper, plastic, vinyl, leather and wood).

- Do not overcharge batteries as permanent damage could result. Do not use a charge current that exceeds the safe level of the battery.
- Do NOT connect the charger's AC and DC input connectors to any power source at the same time.
- Allow the charger or battery to cool down before reconnecting.
- Always disconnect from power source when not in use.

## GLOSSARY OF TERMS

**Amps (A):** The unit of measure for charge current.

**Milli-amps (mA):** A unit of measure for current, being amps (A) multiplied by 1000 and listed as "mA". So 2.5A is the same as 2500mA (2.5 x 1000). To convert mA to amps, divide the mA number by 1000. So 25mA is the same as 0.025A (25 divided by 1000).

**Capacity and milli-amp hours (mAh):** The amount of energy a battery can store is called its **capacity**, which is defined as how much current a battery can supply constantly over one hour of time. Most hobby batteries are rated for capacity in "**mAh**" or **milli-amp hours**. A 650mAh battery can deliver 650mA of current for one hour ( $650\text{mA} \times 1\text{hr} = 650\text{mAh}$ ). A 3100mAh battery can deliver 3100mA (3.2A) of current for one hour ( $3100\text{mA} \times 1\text{hr} = 3100\text{mAh}$ ), etc.

**"C" rating:** Capacity is also referred to as the "C" rating. Some battery suppliers recommend charge currents based on the battery's "C" rating. A battery's "1C" current is the same number as the battery's rated capacity number, but noted in mA or amps. A 600mAh battery has a 1C current value of 600mA, and a 3C current value of (3 x 600mA) 1800mA or 1.8A. The 1C current value for a 3100mAh battery would be 3100mA (3.2A), etc.

## INPUT POWER

**AC Input:** For indoor use, this charger includes a built-in switching AC power supply that delivers power by connecting the AC power cord to a common 110V AC outlet. The AC power supply has a maximum power limitation that limits charge current to 2 amps maximum, and 8-cell transmitter batteries might not reach 100% peak charge but should receive enough energy for extended operation (monitor the power indicator on the transmitter during use). This is normal.

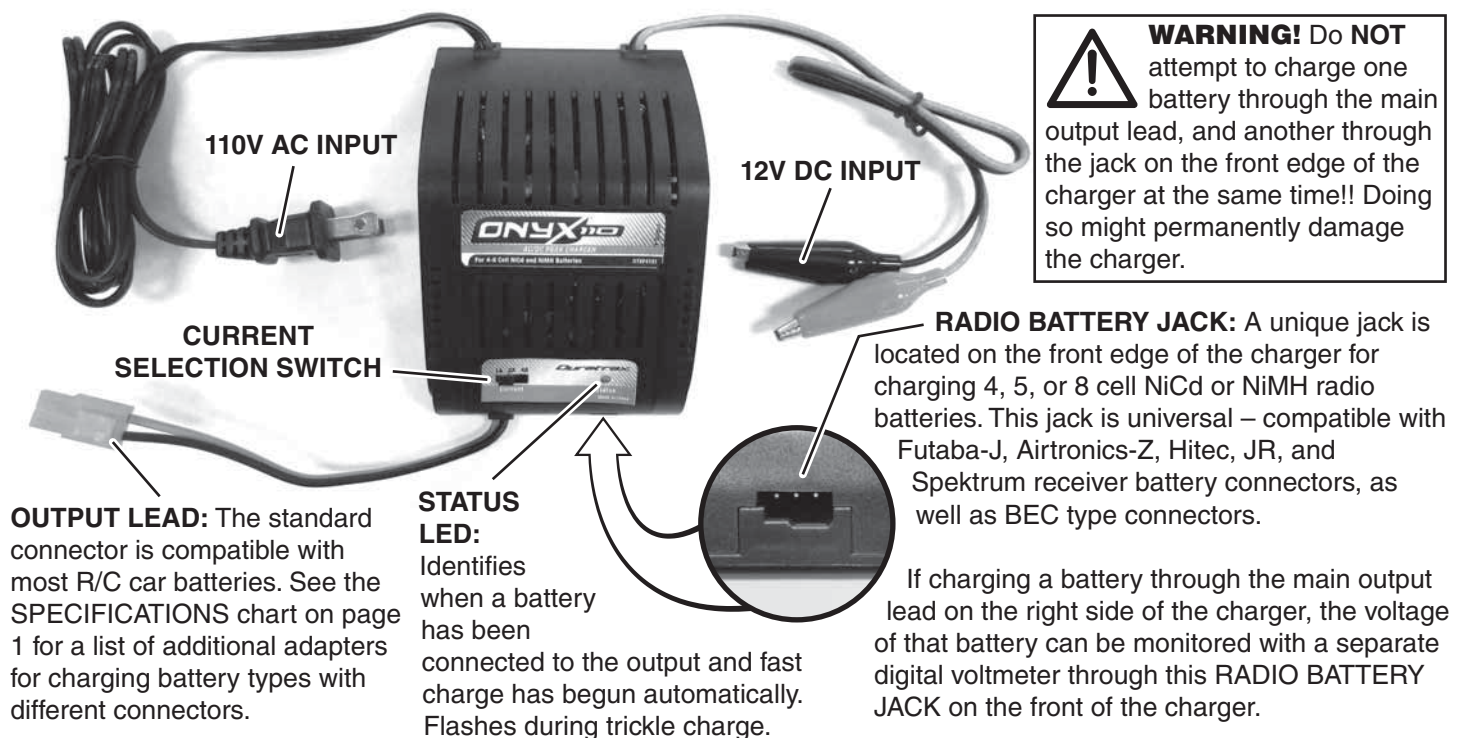
**DC Input:** This charger can be powered by a portable 12V DC power source for use at the track. Connect the DC power cord's alligator clips directly to the output terminals on the 12V DC power source. Always match polarities (red lead to red "+" terminal, black lead to black "-" terminal). To utilize the charger's **absolute maximum** power capabilities the DC power source must be capable of delivering at least 6 amps while maintaining 12 volts DC. Larger batteries, such as 7-cell power packs or 8-cell transmitter packs, will charge more completely if the DC input voltage applied to the input is greater than 13V.



**WARNING!** Never accidentally short together the positive (+) and negative (-) input connections when connected to 12V DC power. Failure to do so could result in permanent damage to the power source and the charger. Do not attempt to connect the charger to AC and DC inputs at the same time.

The charger will be on at all times when connected to input power. Disconnect the charger from input power when not in use.

## CONTROLS AND CONNECTIONS



**OUTPUT LEAD:** The standard connector is compatible with most R/C car batteries. See the SPECIFICATIONS chart on page 1 for a list of additional adapters for charging battery types with different connectors.

**STATUS LED:** Identifies when a battery has been connected to the output and fast charge has begun automatically. Flashes during trickle charge.

**RADIO BATTERY JACK:** A unique jack is located on the front edge of the charger for charging 4, 5, or 8 cell NiCd or NiMH radio batteries. This jack is universal – compatible with Futaba-J, Airtronics-Z, Hitec, JR, and Spektrum receiver battery connectors, as well as BEC type connectors.

If charging a battery through the main output lead on the right side of the charger, the voltage of that battery can be monitored with a separate digital voltmeter through this RADIO BATTERY JACK on the front of the charger.

**WARNING!** Do NOT attempt to charge one battery through the main output lead, and another through the jack on the front edge of the charger at the same time!! Doing so might permanently damage the charger.

## DETERMINING BATTERY TYPE AND SPECIFICATIONS

<b>NICD AND NIMH VOLTAGE CHART</b>	
<b>Number of Cells</b>	<b>Rated Nominal Voltage</b>
4	4.8V
5	6.0V
6	7.2V
7	8.4V
8	9.6V

Always read your NiCd or NiMH battery's label and/or instruction sheet before use. Check your battery's label or instruction sheet to determine how many cells it contains or its nominal rated voltage. The chart at right is a quick reference for determining this information.

## GETTING STARTED

1. Connect the charger to either AC or DC input power.
2. Select a charge current with the CURRENT SELECTION SWITCH. Refer to the chart at right for recommendations. Do not exceed the maximum rated charge current for the battery.
3. The red LED will flash very slowly (once every five seconds) as a reminder that power is applied to the charger, and it is now ready for use.

<b>CHARGE CURRENT RECOMMENDATIONS</b>	
<b>Battery Rated Capacity</b>	<b>Charge Current Setting</b>
600 – 1100mAh	1A
1500 – 2100mAh	2A
2500 – 6000mAh	4A

## STARTING CHARGE

Linear current will be supplied to NiCd and NiMH batteries during charge. Once the charger detects that the battery's voltage has reached peak, it will automatically stop fast charge and start trickle charge.

1. **For 6- or 7-cell power batteries**, connect the battery to the charger's output lead. Make sure the polarities of the battery and charger's leads match (red charger wire to red battery wire, black charger wire to black battery wire). Skip to step 3.
2. **For 4-, 5-, or 8-cell radio batteries**, insert the battery's plug in the RADIO BATTERY JACK on the front edge of the charger. Make sure the battery's black or brown wire is on the right side when inserting into the jack. Refer to the INPUT POWER section on page 2 for details about charging 7- or 8-cell batteries. If a 7- or 8-cell battery does not appear to have reached full peak, attempt to peak charge the battery again by disconnecting it from the charger and then re-connecting.



**CAUTION: Make sure the charge current setting is safe for your battery to prevent overheating of the cells. "AAA", "AA", "A", or "2/3A" size batteries generate heat more quickly than large sub-C batteries. It's NOT recommended to charge batteries having a rated capacity less than 600mAh with this charger. Failure to follow these recommendations could permanently damage your battery! Disconnect the battery from the charger IMMEDIATELY if the battery becomes hot!**

3. Fast charge will start automatically when the charger recognizes the battery is connected to the output. The LED will turn on at this time.
4. When the charger detects the battery has reached peak, fast charge will end and trickle charge will begin automatically. The LED will flash TWICE every five seconds, indicating trickle charge is in process and the battery is ready for use at this time. The charger will remain in trickle charge mode until the battery is disconnected from the charger.

The trickle charge current value is set automatically at a rate being the fast charge current setting divided by 20, as shown in the chart at right.

To manually stop charge at any time, disconnect the battery from the charger. The LED should return to flashing once every five seconds.

A backup safety timer is built into this charger to automatically stop fast charge if peak is not detected in 90 minutes. If you attempted to charge a battery and later found the LED flashing once every 2 seconds, this means the 90 minute safety timer stopped charge (not the peak detection circuit). You could try to peak charge the battery again by disconnecting and then reconnecting it to the charger. Refer to the Troubleshooting Guide for more details.

If the LED flashes in a pattern different than described above, refer to the ERROR INDICATORS AND TROUBLESHOOTING GUIDE for details.

## CARE & HANDLING OF NIMH BATTERIES

- Do not to allow NiMH batteries to overheat. Disconnect overheated batteries from the charger immediately and allow to cool.
- Store NiMH packs with some voltage remaining on the cells (refer to battery supplier).
- It is important to recharge NiMH batteries immediately prior to use, as they have a high self-discharge rate.

<b>TRICKLE CHARGE RATE</b>	
<b>Fast Charge Current</b>	<b>Approx. Trickle Current</b>
1A	50mA
2A	100mA
4A	200mA

## ERROR INDICATORS AND TROUBLESHOOTING GUIDE

Several safety features are included in this charger to protect itself and the battery against certain unwanted conditions, as follows:

<b>TROUBLESHOOTING CHART</b>	
<b>LED ACTION</b>	<b>PROBLEM AND SOLUTION</b>
<b>Flashes once every 2 seconds</b>	90 minute safety timeout occurred. Charge current setting is too low. Battery might have internal problem and require replacement.
<b>Flashes twice quickly</b>	The battery is connected backwards. Reverse connections.
<b>Flashes 3X quickly</b>	The voltage on the input is out of the 11-15V range. Check the voltage on the input, and adjust as necessary.
<b>Flashes 4X quickly</b>	The output has been shorted. Disconnect the battery. Disconnect the charger from input power, then re-connect the charger. Properly re-connect the battery to the charger.

## 5-YEAR LIMITED WARRANTY - \*U.S.A and Canada Only

DuraTrax warrants this product to be free from defects in materials and workmanship for a period of five (5) years from the date of purchase. During that period, DuraTrax will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt). This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, DuraTrax will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may also have other rights, which vary from state to state.

For service on your DuraTrax product, warranty or non-warranty, send it post-paid and insured to:

**HOBBY SERVICES**  
3002 N. Apollo Drive Suite 1  
Champaign, IL 61822

(217) 398-0007  
Email: [hobbyservices@hobbico.com](mailto:hobbyservices@hobbico.com)

\*For warranty and service information if purchased outside the USA or Canada, see the additional warranty information insert (if applicable) or ask your retailer for more information.

